

CLAIMS

What is claimed is:

- 1 1. A method of manufacturing a hydrodynamic torque converter of the
2 type comprising a pump wheel and a turbine wheel, each said wheel comprising an
3 outer shell, an inner shell, and a plurality of vanes connecting said shells, each said
4 vane having edges facing said shells, said method comprising:
5 providing a vane plate for each said vane; and
6 removing material from said vane plate to create open areas surrounding
7 a vane in the vane plate.
- 1 2. A method as in claim 1 wherein said open areas lie within a plate
2 frame which is connected to the vane by holding fins.
- 1 3. A method as in claim 2 wherein each said vane comprises a curved
2 zone and a flat zone separated by a neutral line, said holding fins being linearly aligned
3 with said neutral line.
- 1 4. A method as in claim 1 further comprising providing each said vane
2 with connecting elements for reception in openings in said shells for connecting said
3 vanes to said shells, each said connecting element having a root which is connected to
4 an adjacent said edge by a transition, at at least one said transition being formed as a
5 relief notch having a transition radius between said edge and said connecting element.

1 5. A method as in claim 4 wherein said relief notch is fabricated
2 without a cutting burr.

1 6. A method as in claim 4 wherein said vane has a curved zone
2 adjacent to one of said connecting elements having a root connected to said edge by
3 said at least one transition, said one of said connecting elements being flat.

1 7. A method as in claim 1 wherein said vane has a leading flow edge
2 and a trailing flow edge, said method further comprising pressing said vane plate to
3 smooth the surface of the vane at least one of said leading flow edge and said trailing
4 flow edge.

1 8. A method as in claim 2 further comprising separating said vane
2 from said plate frame and said holding fins by an industrial separating operation.

1 9. A method as in claim 1 further comprising cutting said vane plates
2 from a strip material.

1 10. A method as in claim 1 wherein said vane plate comprises a metal
2 substrate having a coating on at least one side.

1 11. A method as in claim 10 wherein the coating on at least one side of
2 the vane plate is copper plating.

1 12. A hydrodynamic torque converter of the type comprising a pump
2 wheel and a turbine wheel, each said wheel comprising an outer shell, an inner shell,
3 and a plurality of vanes connecting said shells, each said vane comprising:

4 an inner edge facing said inner shell;

5 an outer edge facing said outer shell;

6 a leading flow edge connecting said inner and outer edges;

7 a trailing flow edge connecting said inner and outer edges;

8 a curved zone having a first plane of curvature and extending from said
9 trailing flow edge toward said leading flow edge; and

10 a flat zone extending from said curved zone to said leading flow edge.

1 13. A hydrodynamic torque converter as in claim 12 wherein said
2 curved zone has a second plane of curvature along the trailing flow edge.

1 14. A hydrodynamic torque converter as in claim 12 wherein each said
2 vane has a smooth pressed surface along said trailing flow edge.

1 15. A hydrodynamic torque converter as in claim 12 wherein each said
2 vane has a smooth pressed surface along said leading flow edge.

1 16. A hydrodynamic torque converter as in claim 12 wherein
2 each said vane has a chamfer at at least one of said leading flow edge and said trailing
3 flow edge.

1 17. A hydrodynamic torque converter of the type comprising a pump
2 wheel and a turbine wheel, each said wheel comprising an outer shell, an inner shell,
3 and a plurality of vanes connecting the shells, each said vane comprising an inner edge
4 facing said inner shell and an outer edge facing said outer shell, each said shell having
5 at least one opening with a length and a rear surface facing away from the vanes, each
6 said vane of at least the turbine wheel comprising:

7 a plurality of connecting elements on said edges, said elements being
8 received through respective openings in the shells and deformed against the rear
9 surfaces of the shells to fasten the vanes to the shells, each said connecting element
10 having a root which is connected to an adjacent said edge by a transition, at least one
11 said transition being formed as a relief notch having a transition radius between said
12 edge and said connecting element.

1 18. A hydrodynamic torque converter as in claim 18 wherein said relief
2 notch is fabricated without a cutting burr.

1 19. A hydrodynamic torque converter as in claim 18 wherein each said
2 vane has a curved zone, said relief notch leveling out differences between the curved
3 zone and the connecting element.